

SEQUENCE LISTING

<110> E. I. du Pont de Nemours and Company

<120> Membrane-Bound Desaturases

<130> BB1264

<140> US/09/857,524

<141> 2002-06-21

<150> 60/110,784

<151> 1998-12-03

<160> 17

<170> Microsoft Office 97

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<211> 1471

<212> DNA

<213> Picramnia pentandra

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<221> unsure

<222> (1402)

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<211> 448

<212> PRT

<213> Picramnia pentandra

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Ile Ser Lys Trp Thr Lys Glu His Pro Gly Gly Glu Leu Pro Leu Leu
35 40 45
Ser Phe Ala Gly Gln Asp Val Thr Asp Ala Phe Ile Ala Tyr His Pro
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Gly Thr Ala Trp Gln Tyr Leu Asp Arg Phe Phe Thr Gly Tyr Tyr Val
65 70 75 80
Gln Asp Tyr Ser Val Ser Glu Met Ser Lys Asp Tyr Arg Arg Leu Val
85 90 95
Ser Glu Phe Ser Lys Met Gly Leu Phe Lys Thr Pro Gly Lys Gly Val
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Tyr Cys Ser Ile Phe Phe Val Ser Val Leu Phe Ala Leu Ser Val Tyr
115 120 125
Gly Val Leu Tyr Cys Lys Ser Thr Trp Ala His Leu Cys Ser Gly Leu
130 135 140
Leu Met Gly Met Leu Trp Leu Gln Ser Gly Trp Val Gly His Asp Ser
145 150 155 160
Cys His Tyr Gln Val Met Pro Asn Arg Lys Leu Asn Arg Leu Phe Gln
165 170 175
Ile Ile Ala Gly Asn Val Ile Ala Gly Val Ser Val Ala Trp Trp Lys
180 185 190
Leu Asp His Asn Thr His His Phe Ala Cys Asn Ser Ala Asn Leu Asp
195 200 205
Pro Asp Ile Gln His Leu Pro Ile Ile Ala Ile Ser Pro Lys Phe Phe
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Asn Ser Leu Thr Ser Tyr Tyr His Asn Cys Lys Met Thr Tyr Asp Arg
225 230 235 240
Ala Ala Arg Phe Phe Val Ser Phe Gln His Trp Thr Phe Tyr Pro Ala
245 250 255
Leu Leu Ser Val Arg Leu Tyr Leu Phe Ile Leu Ser Phe Lys Val Val
260 265 270
Phe Ser Asn Asn Lys Arg Val Tyr Lys Arg Ser Gln Glu Ile Leu Gly
275 280 285
Tyr Ala Ala Phe Leu Thr Trp Tyr Ser Leu Leu Leu Ser Arg Leu Pro
290 295 300
Asn Trp Pro Glu Arg Val Met Tyr Phe Thr Ser Cys Leu Ala Val Ala
305 310 315 320
Gly Phe Gln His Trp Gln Phe Ser Leu Asn His Phe Ala Ser Asn Val

325

330

335

Tyr Thr Gly Leu Pro Ser Gly Asn Asp Trp Phe His Gln Gln Thr Lys
340 345 350

Gly Thr Leu Asn Ile Thr Ala Ser Ala Trp Trp Asp Trp Phe His Gly
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Gly Leu His Phe Gln Ile Glu His His Leu Phe Pro Arg Met Pro Lys
370 375 380

Cys His Phe Arg Lys Ile Ser Pro Ile Val Asn Lys Leu Cys Gln Lys
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His Asn Leu Ser Tyr Glu Thr Ala Thr Met Trp Glu Ala Asn Lys Met
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<212> DNA

<213> Zea mays

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<211> 462
<212> PRT
<213> Zea mays

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Ser	Ala	Asp	Asp	Leu	Trp	Ile	Ser	Ile	Ser	Gly	Asp	Val	Tyr	Asp	Val	
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Thr	Pro	Trp	Leu	Pro	His	His	Pro	Gly	Gly	Asp	Leu	Pro	Leu	Leu	Thr	
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 His Val Gln Phe Cys Leu Asn His Phe Ser Ser Asp Val Tyr Val Gly
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 355 360 365
 Asp Ile Leu Cys Ser Pro Trp Met Asp Trp Phe His Gly Gly Leu Gln
 370 375 380
 Phe Gln Ile Glu His His Leu Phe Pro Arg Leu Pro Arg Cys His Leu
 385 390 395 400
 Arg Lys Val Ala Pro Ala Val Arg Asp Leu Cys Lys Lys His Gly Leu
 405 410 415
 Thr Tyr Ser Ala Ala Thr Phe Trp Gly Ala Asn Val Leu Thr Trp Lys
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 35 40 45
 Ile Leu Thr Leu Phe Pro Leu Ser Val Cys Gly Val Leu Phe Ser Asp
 50 55 60
 Ser Thr Phe Val His Val Leu Ser Ala Ala Leu Ile Gly Phe Leu Trp
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 <213> Glycine max

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Val Tyr Asn Val Ser Asp Trp Val Lys Glu His Pro Gly Gly Asp Val
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Pro Ile Ser Asn Leu Ala Gly Gln Asp Val Thr Asp Ala Phe Ile Ala
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Tyr His Pro Gly Thr Ala Trp Ser His Leu Glu Lys Phe Phe Thr Gly
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Tyr His Leu Ser Asp Phe Lys Val Ser Glu Val Ser Lys Asp Tyr Arg
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Lys Leu Ala Ser Glu Phe Ser Lys Leu Gly Leu Phe Asp Thr Lys Gly
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His Val Thr Ser Cys Thr Leu Ala Ser Val Ala Val Met Phe Leu Ile
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Val Leu Tyr Gly Val Leu Arg Cys Thr Ser Val Trp Ala His Leu Gly
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Ser Gly Met Leu Leu Gly Leu Leu Trp Met Gln Ser Ala Tyr Val Gly
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His Asp Ser Gly His Tyr Val Val Met Thr Thr Asn Gly Phe Asn Lys
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Val Ala Gln Ile Leu Ser Gly Asn Cys Leu Thr Gly Ile Ser Ile Ala
          180            185            190

Trp Trp Lys Trp Thr His Asn Ala His His Ile Ala Cys Asn Ser Leu
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Asp His Asp Pro Asp Leu Gln His Met Pro Val Phe Ala Val Ser Ser
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 His Gly
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<210> 9

<211> 1972

<212> DNA

<213> Triticum aestivum

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atattgatcc ttttagctgt tggaaatcgtg ttggattttt cgtgttgcca ggtgactatc 1680
tttgagtttc aatcgtgggt tcatgcttca gttgtgtact tgtacaccat atttagattg 1740
ttgggttctc cctatcatgg taactacatc aatagtactt gatttacatc ataaaatccg 1800
tggtttatct ttacatccat ttcattttgc ttgcaagttc atgaaactgt aaactcaatt 1860
gatggtttgt agcgtgtata tcctgctgct atggcagctt gaactgcatt ttgggaacat 1920
gacgattcca ataataaacg tttagacatt ttctaaaaaa aaaaaaaaaa aa 1972

```

<210> 10

<211> 469

<212> PRT

<213> *Triticum aestivum*

<400> 10

```

Met Ala Arg Thr Gly Leu Ala Asp Ala Thr Ala Pro Glu Ala Asp Ala
  1                5                10                15

```

```

Met Pro Ala Ala Ser Lys Asp Ala Ala Asp Val Arg Met Ile Ser Thr
          20                25                30

```

```

Lys Glu Leu Gln Ala His Ala Ala Ala Asp Asp Leu Trp Ile Ser Ile
      35                40                45

```

```

Ser Gly Asp Val Tyr Asp Val Thr Pro Trp Leu Arg His His Pro Gly
      50                55                60

```

```

Gly Glu Val Pro Leu Ile Thr Leu Ala Gly Gln Asp Ala Thr Asp Ala
      65                70                75                80

```

```

Phe Met Ala Tyr His Pro Pro Ser Val Arg Pro Leu Leu Arg Arg Phe
          85                90                95

```

```

Phe Val Gly Arg Leu Ser Asp Tyr Thr Val Pro Pro Ala Ser Ala Asp
      100                105                110

```

```

Phe Arg Arg Leu Leu Ala Gln Leu Ser Ser Ala Gly Leu Phe Glu Arg
      115                120                125

```

```

Val Gly His Thr Pro Lys Phe Leu Leu Val Ala Met Ser Val Leu Phe
      130                135                140

```

```

Cys Ile Ala Leu Tyr Cys Val Leu Ala Cys Ser Ser Thr Gly Ala His
      145                150                155                160

```

```

Met Phe Ala Gly Gly Leu Ile Gly Phe Ile Trp Ile Gln Ser Gly Trp

```


<212> PRT

<213> Borago officinalis

<400> 11

Met	Ala	Ala	Gln	Ile	Lys	Lys	Tyr	Ile	Thr	Ser	Asp	Glu	Leu	Lys	Asn	
1				5					10					15		
His	Asp	Lys	Pro	Gly	Asp	Leu	Trp	Ile	Ser	Ile	Gln	Gly	Lys	Ala	Tyr	
			20					25					30			
Asp	Val	Ser	Asp	Trp	Val	Lys	Asp	His	Pro	Gly	Gly	Ser	Phe	Pro	Leu	
		35					40					45				
Lys	Ser	Leu	Ala	Gly	Gln	Glu	Val	Thr	Asp	Ala	Phe	Val	Ala	Phe	His	
	50					55					60					
Pro	Ala	Ser	Thr	Trp	Lys	Asn	Leu	Asp	Lys	Phe	Phe	Thr	Gly	Tyr	Tyr	
65					70					75					80	
Leu	Lys	Asp	Tyr	Ser	Val	Ser	Glu	Val	Ser	Lys	Asp	Tyr	Arg	Lys	Leu	
				85					90					95		
Val	Phe	Glu	Phe	Ser	Lys	Met	Gly	Leu	Tyr	Asp	Lys	Lys	Gly	His	Ile	
			100					105					110			
Met	Phe	Ala	Thr	Leu	Cys	Phe	Ile	Ala	Met	Leu	Phe	Ala	Met	Ser	Val	
		115					120					125				
Tyr	Gly	Val	Leu	Phe	Cys	Glu	Gly	Val	Leu	Val	His	Leu	Phe	Ser	Gly	
	130					135					140					
Cys	Leu	Met	Gly	Phe	Leu	Trp	Ile	Gln	Ser	Gly	Trp	Ile	Gly	His	Asp	
145					150					155					160	
Ala	Gly	His	Tyr	Met	Val	Val	Ser	Asp	Ser	Arg	Leu	Asn	Lys	Phe	Met	
				165					170					175		
Gly	Ile	Phe	Ala	Ala	Asn	Cys	Leu	Ser	Gly	Ile	Ser	Ile	Gly	Trp	Trp	
		180						185					190			
Lys	Trp	Asn	His	Asn	Ala	His	His	Ile	Ala	Cys	Asn	Ser	Leu	Glu	Tyr	
		195					200					205				
Asp	Pro	Asp	Leu	Gln	Tyr	Ile	Pro	Phe	Leu	Val	Val	Ser	Ser	Lys	Phe	
	210					215					220					
Phe	Gly	Ser	Leu	Thr	Ser	His	Phe	Tyr	Glu	Lys	Arg	Leu	Thr	Phe	Asp	
225					230					235					240	
Ser	Leu	Ser	Arg	Phe	Phe	Val	Ser	Tyr	Gln	His	Trp	Thr	Phe	Tyr	Pro	
				245					250					255		
Ile	Met	Cys	Ala	Ala	Arg	Leu	Asn	Met	Tyr	Val	Gln	Ser	Leu	Ile	Met	
			260					265					270			
Leu	Leu	Thr	Lys	Arg	Asn	Val	Ser	Tyr	Arg	Ala	His	Glu	Leu	Leu	Gly	
		275					280					285				
Cys	Leu	Val	Phe	Ser	Ile	Trp	Tyr	Pro	Leu	Leu	Val	Ser	Cys	Leu	Pro	
	290					295					300					

Asn Trp Gly Glu Arg Ile Met Phe Val Ile Ala Ser Leu Ser Val Thr
305 310 315 320

Gly Met Gln Gln Val Gln Phe Ser Leu Asn His Phe Ser Ser Ser Val
325 330 335

Tyr Val Gly Lys Pro Lys Gly Asn Asn Trp Phe Glu Lys Gln Thr Asp
340 345 350

Gly Thr Leu Asp Ile Ser Cys Pro Pro Trp Met Asp Trp Phe His Gly
355 360 365

Gly Leu Gln Phe Gln Ile Glu His His Leu Phe Pro Lys Met Pro Arg
370 375 380

Cys Asn Leu Arg Lys Ile Ser Pro Tyr Val Ile Glu Leu Cys Lys Lys
385 390 395 400

His Asn Leu Pro Tyr Asn Tyr Ala Ser Phe Ser Lys Ala Asn Glu Met
405 410 415

Thr Leu Arg Thr Leu Arg Asn Thr Ala Leu Gln Ala Arg Asp Ile Thr
420 425 430

Lys Pro Leu Pro Lys Asn Leu Val Trp Glu Ala Leu His Thr His Gly
435 440 445

<210> 12

<211> 469

<212> PRT

<213> Triticum aestivum

<400> 12

Met Ala Arg Thr Gly Leu Ala Asp Ala Thr Ala Pro Glu Ala Asp Ala
1 5 10 15

Met Pro Ala Ala Ser Lys Asp Ala Ala Asp Val Arg Met Ile Ser Thr
20 25 30

Lys Glu Leu Gln Ala His Ala Ala Ala Asp Asp Leu Trp Ile Ser Ile
35 40 45

Ser Gly Asp Val Tyr Asp Val Thr Pro Trp Leu Arg His His Pro Gly
50 55 60

Gly Glu Val Pro Leu Ile Thr Leu Ala Gly Gln Asp Ala Thr Asp Ala
65 70 75 80

Phe Met Ala Tyr His Pro Pro Ser Val Arg Pro Leu Leu Arg Arg Phe
85 90 95

Phe Val Gly Arg Leu Thr Asp Tyr Thr Val Pro Pro Ala Ser Ala Asp
100 105 110

Phe Arg Arg Leu Leu Ala Gln Leu Ser Ser Ala Gly Leu Phe Glu Arg
115 120 125

Val Gly His Thr Pro Lys Phe Leu Leu Val Ala Met Ser Val Leu Phe
130 135 140

Cys Ile Ala Leu Tyr Cys Val Leu Ala Cys Ser Ser Thr Gly Ala His

145		150		155		160
Met Phe Ala Gly	Gly Leu Ile Gly Phe Ile Trp Ile Gln Ser Gly Trp	165		170		175
Ile Gly His Asp	Ser Gly His His Gln Ile Thr Arg His Pro Ala Leu	180		185		190
Asn Arg Leu Leu Gln Val Val	Ser Gly Asn Cys Leu Thr Gly Leu Gly	195		200		205
Ile Ala Trp Trp Lys Phe Asn His Asn Thr His His Ile Ser Cys Asn		210		215		220
Ser Leu Asp His Asp Pro Asp Leu Gln His Leu Pro Leu Phe Ala Val		225		230		235
Ser Thr Lys Leu Phe Asn Asn Leu Trp Ser Val Cys Tyr Glu Arg Thr		245		250		255
Leu Ala Phe Asp Ala Ile Ser Lys Phe Phe Val Ser Tyr Gln His Trp		260		265		270
Thr Phe Tyr Pro Val Met Gly Phe Ala Arg Ile Asn Leu Leu Val Gln		275		280		285
Ser Ile Val Phe Leu Ile Thr Gln Lys Lys Val Arg Gln Arg Trp Leu		290		295		300
Glu Ile Ala Gly Val Ala Ala Phe Trp Val Trp Tyr Pro Leu Leu Val		305		310		315
Ser Cys Leu Pro Asn Trp Trp Glu Arg Val Ala Phe Val Leu Ala Ser		325		330		335
Phe Val Ile Thr Gly Ile Gln His Val Gln Phe Cys Leu Asn His Phe		340		345		350
Ser Ser Ala Val Tyr Val Gly Pro Pro Lys Gly Asn Asp Trp Phe Glu		355		360		365
Arg Gln Thr Ala Gly Thr Leu Asp Ile Lys Cys Ser Pro Trp Met Asp		370		375		380
Trp Phe His Gly Gly Leu Gln Phe Gln Val Glu His His Leu Phe Pro		385		390		395
Arg Leu Pro Arg Cys His Tyr Arg Met Val Ala Pro Ile Val Arg Asp		405		410		415
Leu Cys Lys Lys His Gly Leu Ser Tyr Gly Ala Ala Thr Phe Trp Glu		420		425		430
Ala Asn Val Met Thr Trp Lys Thr Leu Arg Ala Ala Ala Leu Gln Ala		435		440		445
Arg Glu Ala Thr Thr Gly Ala Ala Pro Lys Asn Leu Val Trp Glu Ala		450		455		460
Leu Asn Thr His Gly		465				

<210> 13
 <211> 458
 <212> PRT
 <213> Helianthus annuus

<400> 13
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 Lys Tyr Ile Thr Ser Lys Glu Leu Lys Lys His Asn Asn Pro Asn Asp
 20 25 30
 Leu Trp Ile Ser Ile Leu Gly Lys Val Tyr Asn Val Thr Glu Trp Ala
 35 40 45
 Lys Glu His Pro Gly Gly Asp Ala Pro Leu Ile Asn Leu Ala Gly Gln
 50 55 60
 Asp Val Thr Asp Ala Phe Ile Ala Phe His Pro Gly Thr Ala Trp Lys
 65 70 75 80
 His Leu Asp Lys Leu Phe Thr Gly Tyr His Leu Lys Asp Tyr Gln Val
 85 90 95
 Ser Asp Ile Ser Arg Asp Tyr Arg Lys Leu Ala Ser Glu Phe Ala Lys
 100 105 110
 Ala Gly Met Phe Glu Lys Lys Gly His Gly Val Ile Tyr Ser Leu Cys
 115 120 125
 Phe Val Ser Leu Leu Leu Ser Ala Cys Val Tyr Gly Val Leu Tyr Ser
 130 135 140
 Gly Ser Phe Trp Ile His Met Leu Ser Gly Ala Ile Leu Gly Leu Ala
 145 150 155 160
 Trp Met Gln Ile Ala Tyr Leu Gly His Asp Ala Gly His Tyr Gln Met
 165 170 175
 Met Ala Thr Arg Gly Trp Asn Lys Phe Ala Gly Ile Phe Ile Gly Asn
 180 185 190
 Cys Ile Thr Gly Ile Ser Ile Ala Trp Trp Lys Trp Thr His Asn Ala
 195 200 205
 His His Ile Ala Cys Asn Ser Leu Asp Tyr Asp Pro Asp Leu Gln His
 210 215 220
 Leu Pro Met Leu Ala Val Ser Ser Lys Leu Phe Asn Ser Ile Thr Ser
 225 230 235 240
 Val Phe Tyr Gly Arg Gln Leu Thr Phe Asp Pro Leu Ala Arg Phe Phe
 245 250 255
 Val Ser Tyr Gln His Tyr Leu Tyr Tyr Pro Ile Met Cys Val Ala Arg
 260 265 270
 Val Asn Leu Tyr Leu Gln Thr Ile Leu Leu Leu Ile Ser Lys Arg Lys
 275 280 285

Ile Pro Asp Arg Gly Leu Asn Ile Leu Gly Thr Leu Ile Phe Trp Thr
 290 295 300
 Trp Phe Pro Leu Leu Val Ser Arg Leu Pro Asn Trp Pro Glu Arg Val
 305 310 315 320
 Ala Phe Val Leu Val Ser Phe Cys Val Thr Gly Ile Gln His Ile Gln
 325 330 335
 Phe Thr Leu Asn His Phe Ser Gly Asp Val Tyr Val Gly Pro Pro Lys
 340 345 350
 Gly Asp Asn Trp Phe Glu Lys Gln Thr Arg Gly Thr Ile Asp Ile Ala
 355 360 365
 Cys Ser Ser Trp Met Asp Trp Phe Phe Gly Gly Leu Gln Phe Gln Leu
 370 375 380
 Glu His His Leu Phe Pro Arg Leu Pro Arg Cys His Leu Arg Ser Ile
 385 390 395 400
 Ser Pro Ile Cys Arg Glu Leu Cys Lys Lys Tyr Asn Leu Pro Tyr Val
 405 410 415
 Ser Leu Ser Phe Tyr Asp Ala Asn Val Thr Thr Leu Lys Thr Leu Arg
 420 425 430
 Thr Ala Ala Leu Gln Ala Arg Asp Leu Thr Asn Pro Ala Pro Gln Asn
 435 440 445
 Leu Ala Trp Glu Ala Phe Asn Thr His Gly
 450 455

<210> 14

<211> 35

<212> DNA

<213> Artificial Sequence

<220>

<223> Definition of Artificial Sequence: PCR primer for 5' of pk0011.d5

<400> 14

tttgcggccg caaatcaatg gaagaagcaa agaag

35

<210> 15

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Definition of Sequence: antisense PCR primer for 3' of pk0011.d5

<400> 15

tttgcggccg ccaggattca cccgaaagtg ttc

33

<210> 16

<211> 823

<212> DNA

<213> Triticum aestivum

<220>

<221> unsure
<222> (48)
<223> n = A, C, G, or T

<220>
<221> unsure
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<222> (807)

<223> n = A, C, G, or T

<400> 16

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cttctctctg agtcttgacc accctctctc gcgctccagc taaatccacg ccaccgatgg 120
cccgacgggg cttecgggac gcaacggcgc cggaagccga cgcaatgccg gccgccagca 180
aggacgccgc cgacgtccgc atgatctcca ccaaggagct gcaggcgac gccgccggcg 240
acgacctctg gatctccatc tccggggacg tctacgacgt cagccctgg ctgcgccacc 300
acccggggcg cgaggtcccg ctcatcacc tcgcccggca ggacgccacc gacgccttca 360
tggcctacca cccgccctcc gtgcgcccgc tctccgccc cttcttcgtc ggccgcctca 420
ccgactacac tgtccccccc gctccgccc acttccgccc cctcctcgcg cagctctcct 480
ccgcgggcct cttecgagcg gtccggcacac ccccaagttc ctgctcgtcg caaagtctgt 540
gctcttctgc atcggcctct actgctctc gcctgctcaa caccggggcc acatgttcgc 600
cgggggctca ttggcttata tggtcagtcg ggctggattg gcatactccg gcacacaaat 660
cacaggcacc tgcctcaacg ctctgnagtg gctcgggaat gctnacygt cggatcncgt 720
gggagtnanc acacaanaca nattctgaan ngtcacatac ctgactcana ttccgtntcg 780
ggtcacaagt ctaaaacttg catcgtnaag acttggttag cat 823
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<210> 17

<211> 114

<212> PRT

<213> Triticum aestivum

<400> 17

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Met Pro Ala Ala Ser Lys Asp Ala Ala Asp Val Arg Met Ile Ser Thr
  1              5              10              15
```

```
Lys Glu Leu Gln Ala His Ala Ala Ala Asp Asp Leu Trp Ile Ser Ile
      20              25              30
```

```
Ser Gly Asp Val Tyr Asp Val Thr Pro Trp Leu Arg His His Pro Gly
      35              40              45
```

```
Gly Glu Val Pro Leu Ile Thr Leu Ala Gly Gln Asp Ala Thr Asp Ala
      50              55              60
```

```
Phe Met Ala Tyr His Pro Pro Ser Val Arg Pro Leu Leu Arg Arg Phe
      65              70              75              80
```

```
Phe Val Gly Arg Leu Thr Asp Tyr Thr Val Pro Pro Ala Ser Ala Asp
      85              90              95
```

```
Phe Arg Arg Leu Leu Ala Gln Leu Ser Ser Ala Gly Leu Phe Glu Arg
      100             105             110
```

Val Gly
